EV Infrastructure Needs

Clean Fuels Outlet Workshop

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EV Infrastructure Needs

Time-frame dependant:

- Near term focus:
  - Eliminate barriers to home charging station installations
  - Encourage deployment of workplace charging stations
- Long term:
  - Finalize DC fast charging connection standard
  - Develop vehicle/station- grid communication standards

EV Infrastructure Challenges

- Home charging stations:
  - Reduce consumer cost (can be ~$2-3k)
  - Reduce time necessary to have home charge station installed
  - Retain consumer options
- Counter mis-information/ Educate consumers:
  - Basic charge station is a “smart outlet”, and any SAE compliant station will work with any CA ZEV Program EV

EV Infrastructure Connection Standards: Past Experience

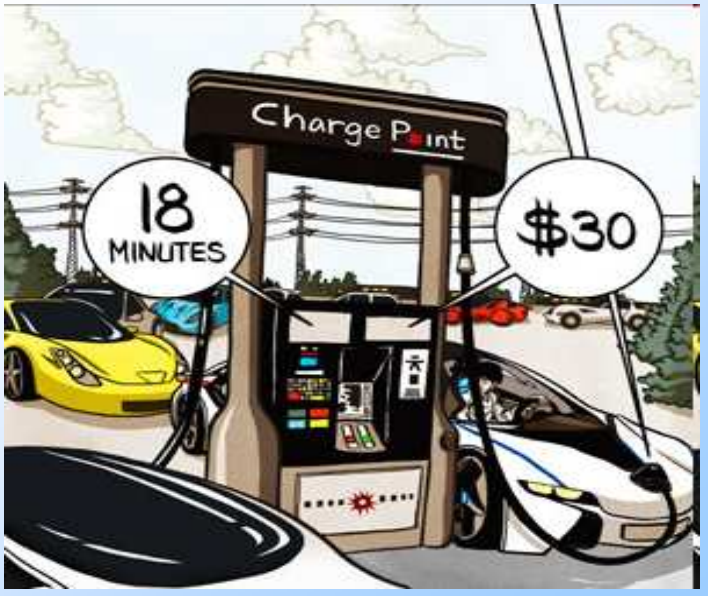
- At one time, there were 5 incompatible EV charging connection types!
- This was reduced to 2 basic types:
  - "Inductive" (paddle)
  - "Conductive" (SAE J1772, formerly with Avcon connector)
- ARB ZEV regulation now requires onboard charger and SAE J1772-compliant inlet

EV Infrastructure Connection Standard: Present

- Latest version of SAE J1772
  adopted on January 14, 2010
- Either 120 VAC (16 A peak)
  or 240 VAC (80 A max, usually 16-32A)
- Use of this connector is required in California for an automaker to earn ZEV credit

EV Infrastructure Connection Standards: Future

- SAE currently developing high power DC charging connection standard
- Several demonstration programs already underway
  - …these are using JARI (Japan Auto Research Institute) connection standard



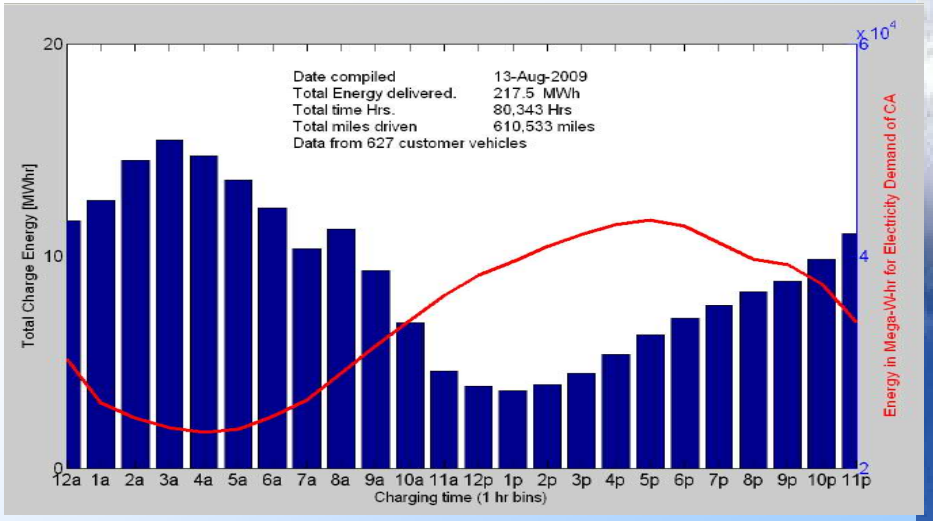
EV Infrastructure Connection Standards: Future

- Communications protocol
  - SAE J2836/ J2847
  - Not needed for near term “basic” charging, but critically needed to enable future “smart charging” option.

Current EV Deployments

- Legacy ‘90’s EVs
- BMW: Mini-e program
- Tesla: Roadster >

- Mitsubishi: iMiev



Coming Soon: "The EV Project"

- Largest deployment of EV charge infrastructure in history
- Approximately 5,000 Nissan Leaf EVs
- 5 States/ 13 Cities,

  Including San Diego, CA
- Project Lead: ECOtality
  - 10,950 Level 2 (220V) Stations
  - 260 Level 3 Fast-Chargers
- DOE funding: $98M

Charging Infastructure Locations

DOE: EV Project

- Objective: collect and analyze data to characterize EV use in diverse conditions,
  - evaluate the effectiveness of charge infrastructure,
  - conduct trials of various revenue systems for public charging (including fast charging)

Current California E-Infrastructure Activity

- PUC (CA Public Utility Commission)
  - Rulemaking to consider AFV tariffs, infrastructure, and policies
- CEC (CA Energy Commission)
  - Administration of AB-118 funds
- ARB
  - Looking at including charging in Clean Fuels Outlet regulation
  - ZEV Regulation will be updated to reference the latest SAE connection standard